

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following have been appointed members of the board of electors to the professorship of astrophysics:—Sir George Darwin, K.C.B., Sir Robert Ball, Sir William Huggins, K.C.B., O.M., hon. LL.D., Mr. Fitzpatrick (president of Queens' College), Dr. Hobson, Dr. Liveing, Sir J. J. Thomson, and Dr. R. T. Glazebrook.

The Rede lecture will be delivered on Thursday, June 24, at 12 noon, in the Senate House, by Sir Archibald Geikie, K.C.B., P.R.S. The subject will be "Darwin as Geologist."

The special board for biology and geology has re-appointed Mr. J. J. Lister to be a manager of the Balfour fund for five years to June, 1914.

LONDON.—The governors of the Imperial College of Science and Technology, following on the appointment of Prof. Adam Sedgwick as professor of zoology at the college, and of Prof. McBride as his special assistant have lost no time in making their intentions known with regard to the work of next session. Provision has been made, quite apart from the general work of the department, for a series of special courses of lectures. These include marine biology and fishery science with practical work at the college, and, during the summer vacation, at the Plymouth station of the Marine Biological Association by Dr. E. J. Allen, director; an advanced course of vertebrate embryology, by Mr. Richard Assheton; and, in addition, courses of entomology and the physiology of development, the lecturers for which have still to be appointed. In addition to the above, the governors have appointed Mr. Dobell as special lecturer in cytology and protistology, subjects of rapidly growing importance so intimately concerned with the phenomena and the causes that underlie the conditions of heredity, health, and disease.

At the meeting of the Senate of the University on May 19, the degree of D.Sc. in physiology was granted to Dr. N. H. Alcock, an internal student of the physiological laboratory, for a thesis entitled "The Physiology of the Peripheral Nerves, especially with regard to their Electrical Phenomena," and other papers. The degree of D.Sc. was also granted to the following external students:—in chemical physiology, to Mr. Charles Dorée, for a thesis on "Cholesterol," and other papers; and in geology, to Mr. John Ball, for a thesis entitled "A Description of the First or Aswan Cataract of the Nile," and other papers.

Mr. F. W. Twort has been appointed superintendent of the Brown Animal Sanatory Institution in succession to Dr. Gregor Brodie, resigned.

Mr. A. R. Brown has been appointed university lecturer in ethnology for the session 1909-10, under the Martin White benefaction.

The principal of the University (Dr. H. A. Miers, F.R.S.) has been appointed a member of the governing body of the Imperial College of Science and Technology in succession to Prof. D. S. Capper, resigned.

The certificates of the joint matriculation examination of the northern universities have been recognised under certain conditions as exempting from the London matriculation examination.

MR. C. A. EALAND, staff instructor in biology at the Essex County Laboratories, Chelmsford, has been appointed principal of the laboratories.

PROF. G. ELLIOT SMITH, F.R.S., professor of anatomy in the Government School of Medicine, Cairo, has been appointed to the chair of anatomy in the University of Manchester.

LORD CURZON OF KEDLESTON, Chancellor of the University of Oxford, was the principal guest at the summer dinner of the Oxford Graduates' Medical Club on May 20. Replying to the toast of "The Visitors," Lord Curzon said that to most people Oxford is identified with the study of what is properly known as humane culture. Very few people outside the colleges are aware of the fact that Oxford was once the home of the school of medicine, and

that it has turned out some of the most distinguished physicians who have cast lustre upon the English name. After eulogising the achievements of Linacre, Sydenham, Wren, Harvey, and Radcliffe, the Chancellor went on to remark that about the middle of the last century the condition of science at Oxford might almost be compared to that of the Dark Ages, and the attitude towards medical science in particular, and to science in general, was one of suspicion if not of active hostility. "In 1850, when the first commission was about to commence its labours at Oxford, there was not a single scientific laboratory in that University, and had the whole of the medical students in Oxford at that time been sent down, they could have been taken to the station, if station there was, in a single four-wheeled cab. But even when the night was darkest, the dawn was nigh; and there has been no more dramatic, more inspiring, or more creditable page in the history of learning than the steps by which science fought its way back into Oxford until, at the present moment, it sits enthroned alongside the humanities and has a crown of equal authority and prestige upon its brow."

THE Department of Agriculture and Technical Instruction for Ireland has published the results of an inquiry, by Mr. F. C. Forth, director of technical instruction for Belfast, into the number of students of each age enrolled in the classes of the Belfast Municipal Technical Institute, together with notes on the increase in attendance that is possible at technical classes. The statistics published in the report are rendered more intelligible when it is remembered that the population of Belfast in 1901 was 349,180, and that about one-fifth of the population, or 63,870, were from five to fourteen years of age, of whom 50,000 were on the rolls of national schools; 7000 were fourteen years of age, of whom only 730 were attending national schools. A satisfactory feature of the statistics is the great increase they show in the number of students at each age during the seven years of the institute's existence. It is clear, too, that the students now begin their evening studies at an earlier age after leaving the day school than was formerly the case. In 1901 there were more students at seventeen than any other age; in 1907 the largest number were sixteen years of age. Another outstanding fact is the large increase in the number of women students as compared with the men. Mr. Forth discusses what he calls "ideal" conditions of education, and arrives at some interesting results. He takes one-sixth of the population to be of elementary-school age and about 2 per cent as of fourteen years of age—which he thinks might be taken as the age for leaving the day school and entering evening classes. If half the number of children of fourteen years of age joined the evening classes and followed up their studies, that would mean 1 per cent. of the population, and if certain other "ideal" conditions prevailed 5½ per cent. of the population would be undergoing technical instruction, and this in the case of Belfast would raise the total number of students' scientific and technological subjects from about 5000 to 20,000 students.

### SOCIETIES AND ACADEMIES.

LONDON.

**Royal Society, May 20.**—Sir Archibald Geikie, K.C.B., president, in the chair.—Observations on the urine in diseases of the pancreas: P. J. **Cambridge**. In the course of a series of observations on the metabolic changes associated with diseases of the pancreas it was found that if the urine of a patient suffering from an inflammatory affection of the gland were boiled with hydrochloric acid, the excess neutralised with lead carbonate, and the freed glycuronic acid precipitated out with tri-basic lead acetate, treatment of the filtrate with phenylhydrazine, after the excess of lead had been removed with sulphuretted hydrogen, yielded a crystalline product which varied in amount with the intensity and stage of the disease. Normal urines, and specimens from patients suffering from diseases in which there was no reason to think that the pancreas was involved, gave no reaction. Twenty-eight cases in which the urine had been examined during life were investigated *post-mortem*, and the results of the urinary examination confirmed. The urines of three dogs

with experimentally induced acute or chronic pancreatitis were found to give a characteristic reaction. A detailed examination of a large quantity of urine from each of eight patients giving a well-marked reaction showed that it was due to a sugar having the reactions of a pentose, and yielding an osazone with a melting point of  $178^{\circ}$  C. to  $180^{\circ}$  C. Attempts to isolate the mother-substance were not successful; it would appear to be derived from the pancreas, and is probably set free as the result of degenerative changes in the gland, passing into the blood, and being excreted in the urine.—*Trypanosoma ingens*, n.sp.: Sir David Bruce and Captains A. E. Hamerton, H. R. Bateman, and F. P. Mackie.—The incidence of cancer in mice of known age: Dr. E. F. Bashford and Dr. J. A. Murray. The relative frequency of cancer at different age periods in female mice has been determined on animals bred for the purpose, the ages, sex, and parentage being carefully recorded. The diagnoses have been made by combining clinical observation with microscopical examination and transplantation of the tumours, and with *post-mortem* examination of the animals. Following Jensen, the authors demonstrated in 1903-4 that cancer can be transmitted artificially from one individual to another of the same species by the implantation and continued growth of living cancer-cells, and have shown that this form of transmission is not responsible for the great frequency of the disease. Other authors have since described "epidemics" of cancer in animals, especially mice. In the course of a year the present authors observed nineteen cases of cancer in their mice. This aggregation of cases corresponds to the "epidemics" adduced as evidence that the disease is infective. The cases have been analysed with reference to the age at which the tumours were first observed. The following table gives the liability to cancer at different age-periods:—

Age	6-9 months	12 months	15 months	18 months	21 months	24 months and over
Total ...	135	110	94	21	6	—
Cancer ...	3	4	7	3	2	—
Per cent. ...	2.2	3.5	7.4	14.2	33.3	—

The progressive increase shown in the table presents a remarkable parallel with the age-incidence of cancer in the human subject, and confirms the earlier statements (Proc. Roy. Soc., January, 1904, &c.) that in animals, whatever their length of life, the recorded frequency of cancer varies, as in man, with the opportunity for examining a sufficiently large number of adult and aged individuals. The observations also add a statistical confirmation to the results of the comparative histological and biological studies of the Imperial Cancer Research Fund, which have shown the close parallel, amounting in many particulars to complete identity, between malignant new growths in man and other vertebrates. They demonstrate that the law of the age-incidence of the disease holds for the shortest-lived mammals as it holds for man. Since the facts agree with the less perfect data for other vertebrates, the general application of the law of age-incidence is probable, and, therefore, any explanation of the etiology of cancer must accord with the circumstance that, when considered *statistically* cancer is a function of age, and when considered *biologically* a function of senescence.—A method of estimating the total volume of blood contained in the living body: Dr. J. O. W. Barratt and Dr. W. Yorke. The principle employed in this method is that of injecting into the blood stream a known amount of dissolved hæmoglobin, and then determining the degree of the resulting hæmoglobinæmia. This enables the volume of the blood plasma to be calculated, and, with the aid of a hæmocrit determination of the composition, by volume, of the blood, the total amount of blood present in the living body is ascertained. The hæmoglobin employed is obtained from the red blood cells of the subject of observation. No ill-effect has been observed after injection of dissolved hæmoglobin. The estimation of hæmoglobin is generally made with von Fleischl's hæmoglobinometer, the scale of the instrument having been previously standardised by means of solutions containing known amounts of red blood cells. When the depth of the natural colour of the blood plasma, before injection, is markedly increased, as sometimes happens, it is difficult to

obtain hæmoglobinometer readings of the amount of dissolved hæmoglobin present after injection. In such cases the blood plasma, suitably diluted, is matched, by means of a comparison spectroscope, with solutions containing known amounts of dissolved hæmoglobin.

**Zoological Society**, May 11.—Prof. E. A. Minchin, vice-president, in the chair.—(i.) Hitherto unrecorded specimens of *Equus quagga*; (ii.) differentiation of the three species of zebras; (iii.) a portion of a fossil jaw of one of the Equidae: Prof. W. Ridgeway.—The batrachians and reptiles of Matabeleland: E. C. Chubb.

**Royal Astronomical Society**, May 14.—Sir David Gill, K.C.B., F.R.S., president, in the chair.—Spectroscopic comparison of  $\alpha$  Ceti with titanium oxide: A. Fowler. The spectrum of the star had been taken by Mr. Slipher at the Lowell Observatory, and that of titanium oxide at South Kensington. The two spectra were, for the most part, identical, and their comparison forms a contribution to the analysis of the third type of spectra, showing the titanium oxide origin of many bands in the red, the details of which are not given by Vogel and Dunér.—Solar parallax papers, No. 7: A. R. Hinks. The present paper gives the details of the general solution from the photographic right ascensions of Eros at the opposition of 1900, the resulting parallax being about  $8.807''$ . A further communication, giving results from micrometric observations, will shortly be presented.—An easily constructed sun-dial: W. E. Cooke. The sun-dial shown was of wood; it could be made by an ordinary carpenter, and was being introduced among the planters and farmers of Western Australia. An adjustment, to be made once for all, reduced local to standard time, and a further adjustment for the equation of time enabled the dial to be read to within about half a minute without the necessity of consulting tables.—Researches on the solar atmosphere: H. Deslandres. M. Deslandres gave an account of his spectrographic work at Meudon Observatory, illustrated by photographs showing the faculæ, &c., in monochromatic light.

**Royal Anthropological Institute**, May 18.—Prof. W. Ridgeway, president, in the chair.—Tibetan and Burmese amulets: Dr. W. L. Hildburgh. The author first referred briefly to the general principles underlying the employment of amulets. He touched on the beliefs in demons or evil spirits as producers of certain diseases, and on the use of protections against such diseases and against others not necessarily caused by similar influences. He also outlined the principal reasons guiding primitive peoples in their choice of amulets. Passing to Tibetan amulets, the author divided them, for convenience of reference, into religious, secular, and natural amulets. The religious amulets consist principally of the well-known printed paper charms, of which a considerable number were exhibited, small images of deities or the like, and relics and other articles with which religious ideas are associated. The secular amulets are such as are formed artificially, but in which the intercession of supernatural beings is not immediately concerned. Such are twisted metal bracelets against strains in the arms, or charms of plaited cords. The natural amulets consist of natural substances in which the protective or curative virtues are inherent, frequently so because of supposed sympathetic connection. Such are parts of the tiger, the elephant, the musk-deer, and other animals, particularly such parts as the teeth, claws, bones, or hairs. The medicinal use of such objects was also mentioned. The paper on Burmese amulets covered the ground in much the same manner. Amongst the principal Burmese amulets referred to by the author were rings made of genuine or imitation elephant hair, ornaments of elephant-nail, parts of various animals, coral, amber ornaments, representations of animals, and objects which had been subjected to magical ceremonies.

**Royal Meteorological Society**, May 19.—Mr. H. Mellish, president, in the chair.—The anticyclonic belt of the northern hemisphere: Colonel H. E. Rawson. In a previous communication the author brought forward some facts regarding the anticyclonic belt of the southern hemisphere, derived from an examination of the South



African records from the year 1841 to 1906. He found that the indications of a cyclical oscillation of the belt to and from the equator over South Africa were strong enough to encourage the belief that an analysis of Australian records on the one side, and of Argentine on the other, would prove that all the action centres of the atmosphere were moving together over this wide area, and that a similar oscillation existed in the northern hemisphere. He subsequently found that investigations of Mr. H. C. Russell and Dr. W. J. S. Lockyer supported his conclusion that there is a period of about 9.5 years between the greatest north and greatest south position of the anticyclonic belt in the southern hemisphere, the double oscillation thus taking nineteen years. He has since extended the inquiry into the movements of the action-centres in the northern hemisphere with the view of ascertaining whether they show any similar oscillation to and from the equator, which is not to be explained by seasonal changes of position. Dealing with the Nile floods, he draws the inference that the high-pressure systems which affect North-east Africa are farther north when the floods are in excess and nearer to Egypt when they are deficient. He also made an analysis of the tracks of the hurricanes which passed north and south of Manila Observatory, and found that these throw an interesting light upon the oscillations of the action-centres of the atmosphere.—Errors of estimation in thermometric observations: A. **Walter**. In examining the returns from a newly inaugurated series of second-order meteorological stations in Mauritius, it was noticed that a large percentage of the thermometer readings was in whole or half divisions. This led the author to analyse the returns, and he gave in the paper the frequency curves of the "tenths of estimation."

**Institution of Mining and Metallurgy**, May 20.—Mr. Edgar Taylor, president, in the chair.—Notes on the Zangezur copper mines: Dr. A. L. **Simon**. A brief description of the geology, mines, and mining conditions and costs of mining, reduction and production of copper in this district of the Little Caucasus.—The determination of tungstic acid in low-grade wolfram ores: H. W. **Hutchins** and F. J. **Tonks**. A description of a new method introduced by the authors, for which it is claimed that it combines the accuracy of the mercurous nitrate method with an improvement in the attack of the mineral, fusion with alkalis being replaced by digestion with caustic soda solution. The preliminary treatment with hydrofluoric acid becomes unnecessary, and the charge of ore can be much larger than is customary. The paper consists of two parts, section i. dealing with the working details of the assays employed, with a tabulation of results for comparison, whilst section ii. is supplementary, and consists mainly of an investigation of conditions affecting the aqua regia method and that here brought to notice.—Cupellation experiments; the thermal properties of cupels: C. O. **Bannister** and W. N. **Stanley**. The authors here record a series of careful experiments made for the purpose of comparing patent cupels (i.e. cupels made with a magnesite base) with bone-ash cupels, as regards their relative diffusivity of heat, specific heat, and rate of cooling, &c., and the result of their tests was to establish the existence of great differences in the thermal properties of the two classes of cupel mentioned, notably as follows:—the diffusivity of heat and specific heat of patent cupels are greater, and the actual temperature of the cupelling button is much lower, at the same temperature of muffle, in patent cupels than in those made of bone-ash, and silver beads take longer to solidify and spit, and are, indeed, much less likely to spit, on patent than on bone-ash cupels.—The bessemerising of hardhead: D. M. **Levy** and D. **Ewen**. The authors found, in the course of researches conducted to that end, that it is possible by bessemerising to convert hardhead, which is one of the waste products of tin smelting, into a highly ferruginous slag, and a fume consisting to a large extent of arsenic oxide with some tin oxide, whilst nickel and cobalt gradually concentrate in the diminishing button. The heat evolved by the operation is sufficient to keep the products molten and the process self-supporting. It remains to be ascertained, however, whether the slags can be obtained of sufficiently low tin contents to make the process a commercial success.—The

use of standards in reading gold pannings: S. J. **Lett**. Having procured for his own use weighed standards of gold dust for comparison when reading pannings, the author submitted a description of these for the benefit of others requiring a handy and portable apparatus by means of which it is, the author claims, possible to gauge accurately a much smaller quantity than 1 dwt.—Notes on the scaling and sweating of copper battery plates: S. F. **Goddard**. This is a brief account of the results of cleaning two copper plates after fifty months' running, during which period 33,000 tons of quartz ore were crushed. It was found subsequently, by melting the plates, that only an exceedingly small percentage of gold was actually absorbed by the copper, and that only in the upper portion.

MANCHESTER.

**Literary and Philosophical Society**, May 4.—Mr. F. Jones, president, in the chair.—The tent-building habits of the ant *Lasius niger*, Linn., in Japan: Dr. Marie **Stopes** and C. G. **Hewitt**. The species of ant constructing the nests, which were cylindrical in shape, is *Lasius niger*, the common brownish-black ant occurring in our English gardens. In this particular district of Hayama, within fifty miles of Tokyo, it constructs shelters of minute grains of sand cemented together on the twigs of the Ilex as axes. The object of these nests is to afford shelter for aphides or "plant-bugs" which live upon the plant and are looked after by the ants for the sake of the "honeydew" which they secrete. The shelters not only keep the aphides warm, and so increase their yield of "honeydew," but also prevent them from escaping and protect them from their enemies and other ants. For their own convenience the ants also construct covered galleries of the sand detritus, which wind round the trunk of the tree and communicate with the tents in which the aphides are confined and with their own nest on the ground. This is the only case described of *L. niger*, which has a world-wide distribution, constructing tents of this kind.—The permanent change of volume effected in cast irons by repeated heatings: Prof. H. F. **Rugan** and Prof. H. C. H. **Carpenter**.

DUBLIN.

**Royal Dublin Society**, April 20.—Mr. J. E. Gore in the chair.—Mechanical stress and magnetisation of iron: W. **Brown**. Results have been obtained with iron wires in a perfectly uniform magnetic field throughout their entire length by varying the magnetic field, the load, the size of wire, and the magnitude of the current through the wire.—Methods of determining the amount of light irregularly reflected from rough surfaces: Prof. W. F. **Barrett**. The amount of light irregularly reflected from rough surfaces is a matter of considerable practical importance, especially in the case of large surfaces, such as walls and buildings, but no satisfactory data appear to be obtainable. The law of inverse square being inapplicable to such surfaces, the author has employed two methods, which yield satisfactory results. A Lummer-Brodhun or other similar type of photometer is employed, and the intensity of the stronger light reduced by (1) a rapidly revolving opaque disc having a sector cut out, the size of which can be accurately adjusted until a photometric balance is obtained, or (2) by an adaptation of the author's instrument for determining the "light-threshold" of the eye. In this case the stronger light is reduced by absorption through a column of liquid of neutral tint, the length of the column being capable of easy and accurate adjustment. By this means measurements can be made of the light diffused at various angles from small surfaces, which are used to replace the silvered mirror that reflects the standard light through the liquid column. This arrangement also affords a convenient method of testing different systems of lighthouse illuminants.—A new form of polarimeter for the measurement of the indices of refraction of opaque bodies: Prof. W. F. **Barrett**. By means of Brewster's law the index of refraction of opaque non-metallic bodies can be found if the angle of maximum polarisation by reflection can be determined. In the instrument devised by the author this angle is expeditiously found by causing the telescope, which projects a parallel incident beam on to the reflecting surface, and

the collimator which carries the analyser, to move simultaneously through equal angles by means of a simple form of link motion. A source of monochromatic light (a small glow-lamp in a coloured globe) is rigidly attached to, and moves with, the telescope. To enable opaque liquids to be examined, the graduated circle over which the telescope and collimator move is fixed in a vertical plane. Fusible substances are contained in a porcelain capsule, which can be heated by steam or by an electric current, so that a reflecting liquid surface is thus obtained. Further observations on the powdery scab of the potato, *Spongospora subterranea* (Wallroth): Prof. T. Johnson. The author brought forward evidence in favour of the view that the organism responsible for the scab is a true slime-fungus identical with the *Erysibe subterranea* described by Wallroth in 1842. He also gave an account of experiments conducted last year to prevent the scab.

## PARIS.

Academy of Sciences, May 10.—M. Émile Picard in the chair.—Critical examination of the monochromatic images of the sun with the hydrogen lines: H. Deslandres and L. d'Azambuja. A further instalment of the results obtained with the large spectroheliograph at Meudon, a description of which instrument is given in an earlier paper. For the red hydrogen line, the first-order spectrum with a grating gave sufficient dispersion. With this arrangement, not only has the entire line been isolated, but also separately the centre of the dark line and its edges. The image of the centre, representing the upper layer of hydrogen, has been compared with the corresponding layer  $K_2$  of calcium, and was found to present the same characters, although somewhat weakened. Some of the phenomena previously observed are shown to be due, not to peculiarities in the emissive or absorptive power of hydrogen, but to an instrumental cause, a defect of the spectroheliograph.—The unsymmetrical enlargement of the lines of the arc spectrum and their comparison with those of the solar spectrum: Ch. Fabry and H. Buisson. When the arc is produced between iron poles in a vacuum it is less luminous than when produced at atmospheric pressure and all the lines are much finer. Certain lines, which in the air arc are distinctly thickened, in a vacuum cannot be distinguished from the others. The observations form a complete confirmation of the explanation given by the authors of the anomalies observed in the comparison of the sun and arc spectra.—A recent note of M. Stekloff: E. Goursat. A claim for priority.—Problems of elasticity in two dimensions: C. Kolossoff.—The nomographic representation of equations with four variables: Maurice d'Ocagne.—An arrangement of a carrying surface for an aeroplane: Maurice Caron.—An apparently abnormal fact which occasionally occurs in commercial transformers: M. Gacogne and A. Léauté. The anomaly described is due to the capacity of the transformer.—An influence of radium on the velocity of crystallisation: Louis Frieschauer. Comparative measurements were taken of the rate of crystallisation of droplets of surfused sulphur, a portion of the sulphur only being exposed to the radiation from radium salt. In the latter case the velocity of crystallisation was increased. The radium emanation gave a similar result, but exposure to the Röntgen rays was without influence. It would thus appear that it is the  $\alpha$  rays which are active in this respect.—Thermosmosis: M. Aubert.—The charge of a negative ion of a flame: Georges Moreau. The charge found  $e=4.3 \times 10^{-10}$ , and may be compared with the value for the charge of an electron found by Millikan (4.06), Perrin (4.1), and Rutherford (4.65), all divided by  $10^{10}$ .—The discharge of inductors: E. Caudrelier.—The teleautocopyist for the transmission of images to a distance: Laurent Sémat. A description is given of the apparatus and of the method of securing the necessary isosynchronism. All the operations take place in daylight, and are controlled by purely mechanical methods, neither photography nor selenium being used. About five minutes are required to transmit a plate measuring 7 cm. by 12 cm.—Wireless telephony: MM. Colin and Jeance. The special advantages of the apparatus described are the arrangements of the negative electrodes of the arcs to ensure steadiness, the utilisation of an intermediate circuit

for giving a simple constant oscillation, and the arrangement of the microphones.—The radium emanation: A. Debiérne. The volume of emanation in equilibrium with 1 gram of radium was found to be, in mean, 0.58 cubic millimetre, in close agreement with the results of Rutherford and Røyd, but much smaller than the 7 cubic millimetres of Ramsay and Cameron. From the curves of decrease of the intensity of the radiation a diminution to one-half takes place in 3.81 days.—The anhydrous combinations of thorium chloride with the alkaline chlorides: Ed. Chauvenet. Anhydrous thorium chloride combines with the alkaline chlorides, giving compounds of the type  $\text{ThCl}_4 \cdot 2\text{MCl}$  with the metals Li, Na, K, Rb, and Cs, and  $\text{ThCl}_4 \cdot 4\text{MCl}$  with Rb and Cs only. Ammonium chloride forms the exceptional compound  $\text{ThCl}_4 \cdot \text{NH}_4\text{Cl}$ .—Benzoyl-acrylic acid. The condensation of glyoxylic acid with some ketones: J. Bougault. In alkaline solution glyoxylic acid readily condenses with acetophenone and analogous ketones, forming diphenylacetic acid or analogous acids. Dianisylacetic and dipercylacetic acids, prepared by this reaction, are described.—The modifications of anthesterol and its benzoate: M. T. Klobb.—A nephelinic syenite from the Transvaal: H. A. Brouwer.—The energy necessary for kneading by machinery: M. Ringelmann.—Observation of ovules of the rabbit with two germs, contained in a common envelope of albumen secreted by the oviduct: Cl. Regaud and G. Dubreuil.—A popular remedy for cancer: Robert Odier.—The regulation of the secretions by d'Arsonvalisation: Foveau de Courmelles. The high-frequency treatment leads to increased secretion of urea, uric acid, and chlorides, together with a diminution in the amount of phosphate eliminated.—Costiasis and its treatment in young trout: Louis Léger. The use of a weak solution of formalin (35 c.c. to 40 c.c. of the 40 per cent. solution in 100 litres of water) is suggested for destroying the parasite (*Costia necatrix*), the cause of the disease. The young trout are not injured by this solution. Another trout disease gyrodactylosis, is cured by the same treatment.

May 17.—M. Émile Picard in the chair.—Biaxial crystallised liquids: Fred. Wallerant. Liquid azoxyanisole shows the true properties of biaxial crystals. This is regarded as an argument in favour of the absolute identity of liquid and solid crystallised bodies.—A new Australian Onychophorus: E. L. Bouvier. The new species resembles *Peripatoides Suteri*, but this resemblance is only superficial, since many distinctive characters are different.—Surfaces of total constant curvature: C. Guichard.—The value of the invariants  $\rho$  and  $\rho_0$  for surfaces of the fourth order with double isolated points: L. Remy.—The residues of measurable functions: Frédéric Riesz.—The principle of Dirichlet and the development of harmonic functions in polynomial series: Serge Bernstein.—Linear differential equations and uniform transcendents of the second order: René Garnier.—An example of the Zeeman effect, positive and longitudinal, in the emission spectra of vapours: A. Dufour.—The chromatic circle according to Young's hypothesis: A. Rosenstiehl. The new chromatic circle designed by the author gives colours possessing the following qualities of the fundamental colours required by Young's theory:—the complementary of the orange is the first green-blue; the third yellow-green, of which the complementary is the first violet; and the third blue, having as complementary the yellow placed between the first and second yellow. The defects of the old colour circle are discussed.—Measurements of the Brownian movements in gases and the charge of particles in suspension: M. de Broglie. From an ultramicroscopic study of the motion of a charged particle of tobacco smoke in an electric field, followed by the application of the formulæ of Stokes and Einstein, the value for the charge  $e$  is deduced as  $4.5 \times 10^{-10}$ , agreeing well with the results obtained by different methods.—The lower harmonics: G. Sizes and G. Massol.—Cathodic projections: L. Houlevigüe. It is known that a cathode placed in a vacuum projects, besides corpuscles deviated by a magnet, particles of itself. Since these are not appreciably deviated by a magnetic field, it follows that these particles have either a relatively large mass, a small electric charge, or a high velocity. The experiments here recorded accord



with the first hypothesis.—The freezing point of gaseous mixtures at very low temperatures: **Georges Baume**. An apparatus is described and figured by means of which accurately measured volumes of pure gases can be mixed and frozen, and the freezing point determined. The apparatus has been applied to the cases of mixtures of methyl oxide and hydrochloric acid, methyl oxide and sulphur dioxide, and methyl oxide and methyl chloride.—The theory of organic bases according to the viscosity of their solutions: **D. E. Tsakalotos**. From measurements of the viscosity of aqueous solutions of trimethylamine, pyridine, piperidine, and nicotine, the conclusion is drawn that all these bases form molecular combinations with water.—Study of the system water, liquid ammonia. Concordance of the results with the hypothesis of ammonium hydrate: **E. Baud** and **L. Gay**. Measurements were made of the heat disengaged and the contraction accompanying the mixture of water and anhydrous ammonia. The experimental results agree with the hypothesis of the existence in aqueous solutions of ammonia of the hydrate  $\text{NH}_3 \cdot \text{H}_2\text{O}$ , in equilibrium with water and free ammonia.—The colouring properties of lead chromate: **Léo Vignon**. Chromate of lead in suspension is taken up by cotton, wool, and silk, the depth of dye varying with the proportion of chromate in the bath, but being nearly identical for all three materials.—Dipropargyl: magnesium derivative, octadienedioic acid: **MM. Lespieau** and **Vavon**.—The gaseous, respiratory exchanges of the aerial vegetative organs of the vascular plants: **G. Nicolas**.—The presence of indol-producing bodies in culture broths: **Ch. Porcher** and **L. Panisset**. The use of the indol reaction as a test for certain bacteria is liable to lead in certain cases to erroneous conclusions, since the reaction may sometimes be given by the original culture fluid.—The action of the Bulgarian ferment *yoghourt* on various sugars: **Gabriel Bertrand** and **F. Ducháček**. Arabinose, xylose, sorbose, maltose, saccharose, and mannitol are not fermented by this agent, but glucose, mannose, galactose, levulose, and lactose are easily fermented. In all cases the fermentative products contain *d*- and *l*-lactic acids, a small proportion of formic and acetic acids, and succinic acid.—The influence of boric acid on diastatic actions: **H. Agulhon**.—The ichthyological fauna of Lake Tchad: **J. Pellegrin**.—The stratigraphical characters of the layers of the French and Swiss Alps: **Émile Haug**.—The tectonic of the southern slopes of the *massifs* of Canigou and Puigmal: **O. Mengel**.—The stratigraphical results of an expedition in Chaoufa, Morocco: **Louis Gentil**.—The cranial capacity of fossil men of the type known as Neanderthal: **Marcellin Boule**. Direct measurements of the capacity of the fossil skull from La Chapelle-aux-Saints gave a volume of about 1600 c.c., and it is suggested that the volume of the Neanderthal skull is of the same order, and that the 1230 c.c. attributed to it by Schaaffhausen, Huxley, and Schwalbe is too small.—The bend of the Rhine at Bâle: **Gabriel Eisenmenger**.

## DIARY OF SOCIETIES.

### THURSDAY, MAY 27.

ROYAL SOCIETY, at 4.30.—Notes concerning Tidal Oscillations upon a Rotating Globe: **Lord Rayleigh, O.M., F.R.S.**—The Absolute Value of the Mechanical Equivalent of Heat in Terms of the International Electrical Units: **Prof. H. T. Barnes**—An Approximate Determination of the Boiling Points of Metals: **H. C. Greenwood**.—Some Results in the Theory of Elimination: **A. L. Dixon**.—The Liquidus Curves of the Ternary System Aluminium-Copper-Tin: **J. H. Andrew** and **C. A. Edwards**.—Studies on the Structure and Affinities of Cretaceous Plants: **Miss M. C. Stopes** and **Dr. K. Fujii**.

ROYAL INSTITUTION, at 3.—Newfoundland: **J. G. Millais**.

INSTITUTION OF MINING ENGINEERS, at 11.—Presidential address: **Dr. R. T. Moore**.—Electricity in Coal-mines: **R. Nelson**.—Comparison between the Value of Surplus Gas from Regenerator Bye-product Cokes and Steam produced by the Waste Heat from Bye-product Cokes, with Special Reference to the Evence Coppée new Bye-product Ovens: **M. H. Mills**.

### FRIDAY, MAY 28.

ROYAL INSTITUTION, at 9.—Advances in our Knowledge of Silicon as an Organic Element: **Dr. J. Emerson Reynolds, F.R.S.**

INSTITUTION OF MINING ENGINEERS, at 10.30.—The Use of Concrete for Mine Support: **Prof. W. R. Crane**.—Mining in British Columbia: **Mrs. Rosalind Young**.

### SATURDAY, MAY 29.

ROYAL INSTITUTION, at 3.—The Secret Societies of the Banks' Islands: **Dr. W. H. R. Rivers, F.R.S.**

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### TUESDAY, JUNE 1.

ROYAL INSTITUTION, at 3.—Biological Chemistry: **Dr. F. Gowland Hopkins, F.R.S.**

### WEDNESDAY, JUNE 2.

ENTOMOLOGICAL SOCIETY, at 8.—On the Colonisation of New Nests by Myrmecophilous Coleoptera: **H. St. J. Donisthorpe**.  
SOCIETY OF PUBLIC ANALYSTS, at 8.

### THURSDAY, JUNE 3.

ROYAL INSTITUTION, at 3.—A Modern Railway Problem: **Steam v. Electricity**: **Prof. W. E. Dalby**.

LINNEAN SOCIETY, at 8.—On the Alcynaria of the *Sealark* Expedition: **Prof. J. A. Thomson**.—On the Cephalochorda of the *Sealark* Expedition: **H. A. S. Gibson**.—Report on the Porifera collected by **Mr. C. Crossland** in the Red Sea: **R. W. Harold Row**.

RÖNTGEN SOCIETY, at 8.15.—Annual General Meeting.

INSTITUTE OF ACTUARIES, at 5.—Annual General Meeting.

### FRIDAY, JUNE 4.

ROYAL INSTITUTION, at 9.—Researches in Radiotelegraphy: **Prof. J. A. Fleming, F.R.S.**

GEOLOGISTS' ASSOCIATION, at 8.—The Fossiliferous Lower Keuper Rocks of Worcestershire: **L. J. Willis**.

### SATURDAY, JUNE 5.

ROYAL INSTITUTION, at 3.—The Vitality of Seeds and Plants: (1) A Vindication of the Vitality of Plants: **Dr. F. F. Blackman, F.R.S.**

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